
Tube Data and Omni Classifications.

Update: 5th December 2010.

After a few months, it looks like this page has become the primary resource across the world for US Gen3 Omni data. It's been a collaborative effort and the data is expanding constantly as I add further information. So it's probably time to clarify how to use the data. I'm also splitting the page because it's getting WAY too big now... I never realized when I started this project just how big it would get and how much data I would collect. A big thanks to everyone who helps me keep it accurate also - It's only now that I'm finally getting down to the real detail for some tubes while for others, I have little more than a stock number. Anyway, the notes...

Note 1. The "OMNI" data isn't a specification. Gen3 Omni VII is a specification, but not a performance specification. Omni refers to the contract under which a tube was purchased, not the performance level of the tube. Since I published this data, it's confused a LOT of people, so to clarify, the TUBE DATA under the OMNI headings represents the typical performance of US used tubes of the MX10160 family and represents the latest iteration of that tube. That changes slightly with Omni VIII but I'm still collecting data on that.

Note 2. ALL tubes of the SAME family (eg, MX-10160A/AVS-6) perform roughly the same. A MX-10160A/AVS-6 tube made in 1995 performs roughly the same as a tube made in 2009. If you find a MX-10160A that's been made under Omni VII, don't go assuming it performs like an OMNI VII tube. It's still the same as the Omni IV/V tube. AND YES, they made some of these under OMNI III.

Note 3. The word MILSPEC gets used a lot, so here's the ACCURATE DEFINITION of what it is. It refers to tubes that meet a performance specification as defined for a US Military contract. If a contract comes out for tubes from the military, then the tubes made for that contract that meet that specification ARE MILSPEC. ALL OMNI TUBES (tubes made for Omni Contracts) are MILSPEC and every tube will be made for a contract, however ANY tubes that are made to a specific specification and meets or exceeds ALL provisions of that specification ARE ALSO MILSPEC according to that specification. Hence, a MX-10160A manufactured in 2007 is technically a MILSPEC OMNI VII tube.

Note 4. To avoid the confusion this causes, you'll notice I've listed some tubes only under certain contracts. This typically represents the contracts under which that tube were primarily ordered and this is how these tubes should be viewed.

Note 5. Tubes other than the MX10160 series are also included (eg MX11620, MX11729) - These tubes have different performance specifications. See the tube breakdown details for more information.

Note 6. To know what tube you really have, look for the NSN in the tube data breakdowns. Keep in mind though, military records aren't as consistent as you might imagine...

Sorry to confuse the matter further with this explanation, but some people seem to think that a MX10160A from 2007 is significantly better than a MX10160A from 1995. On paper, they are pretty much the same, though slight differences may be present in the manufacturing process and they did vary the performance specification slightly with each Omni iteration. However they usually vary the suffix as well, since for aviation purposes, you really don't want to go accidentally mixing tubes of different performance specifications.

Understanding US Omni classifications.

Nearly all military US Gen3 devices are classified by FOM (Figure of Merit) but are also differentiated by the contract under which they were produced. These contracts (Omnibus contracts) each placed different minimum performance characteristics on manufactured products. As such, a US milspec tube could fall under any one of these procurements but most commonly, tubes are referred to the contract under which they were first produced. Based on the MX10160 tube, the following table provides approximate performance levels for each Omni generation.

Thankyou to all who have helped with collecting this information - particular thanks also to:

- Edward R Wilcox Jr.
- Flex297 from US forums.
- Stanley from US forums.

The initial collection of data and creation of the table would not be possible without their help and postings of general information to the Internet.

PLEASE NOTE! This is a WORK IN PROGRESS. There is no simple, complete and accurate table for this information ANYWHERE so it may change once in a while as I tweak it and make any corrections.

Omni Classifications

14 August 2011

Omnibus Classes	Based on MX10160							
Contract	Omni I	Omni II	Omni III	Omni IV	Omni V	Omni VI	Omni VII	Omni VIII
Comments	Early Gen3 - Not all that far above Gen2 of era.	Another early Gen3, again not that advanced.	The first advanced Gen3 with significant improvement is S/N	Significant increase in photocathode performance levels.	Very advanced. See's introduction of Gen4.	Continual improvement of the technology.	Autogated Thin-Film Replaces US specs for Gen4.	First contract Aug 2010 Specs released 23 Dec 2010
Resolution lp/mm	36	45	51	64	64	64	64	64
S/N	16.2	16.2	19	21	21	25	28	25 min
Photocathode sensitivity uA/lm@2856K	1000	1000	1350	1800	1800	2000	2200	2000
Sensitivity at uA/lm@830nm	100 60@880	100	135	190	190	230@830 100@880	120@880	190@830 80@880
Gain fL/fc	20,000-35,000	40,000-70,000	40,000-70,000	40,000-70,000	40,000-70,000	50,000-80,000	50,000-80,000	25,000-110,000
MTF@2.5lp/mm	0.83	0.83	0.9	0.92	0.92	0.92	0.92	Nominal
MTF@7.5lp/mm	0.58	0.6	0.7	0.8	0.8	0.8	0.8	Nominal
MTF@15lp/mm	0.28	0.38	0.45	0.61	0.61	0.61	0.61	0.61
MTF@25lp/mm	0.08	0.18	0.2	0.38	0.38	0.38	0.38	0.38
Halo (mm)	1.47	1.47	1.47	1.25	1.25	0.90	0.70	1
Phosphor	P-20	P-20	P-20/P-43	P-43	P-43	P-43	P-43	P-43
Year	1982	1985	1990	1996	1999	2002	2006	2010
EBI (x10 ⁻¹¹)	2.5	2.5	2.5	2.5	2.5	2.5	3	3

Tubes supplied	MX-9916/UV				MX-	MX-10160C	MX-10160C	
	MX-9644/UV	MX-9916/UV			10160A/AVS-6	/AVS-6	ID 80063-	
	MX-	MX-	MX-	MX-	ID 80063-		A3279602	
	10130A/UV	10160/AVS-6	10160/AVS-6	10160A/AVS-6	A3256389	MX-11769/UV	MX-	MX-10130D/UV
	MX-	ID 54490-	ID 54490-	ID 80063-	MX-	MX-10130D/UV	11769/UV	MX-12389
	10130B/UV	5002760	5009100	A3256389	10160B/AVS-6	MX-10160B/AVS-6	MX-	DFG (Digital Fusion
	MX-	MX-10160	MX-	MX-	filmless and	ID 80063-A3279453	10130D/UV	Goggles) Enhanced-
	18281/PVS-	MX-	10160A/AVS6	MX-11769/UV	thinfilm	(Litton Filmless)	ENVG	ANVIS MX-10160B
	7A	10130B/UV	MX-10160	MX-10160A	MX-	ID 80063-A3279593	(Enhanced	
	MX-	MX-	MX-10160C/UV	MX-11620/UV	10130D/UV	(ITT Thin Film)	NVG)	
Contracts:	18282/PVS-	10130C/UV			MX-11769/UV		FGS (Fusion	
	7B				MX-11620/UV		Goggle	
							System)	
							W9124Q-05-	
							D-0821	
							W9124Q-05-	
							D-0823	
							N00164-07-	
							R-85240 -	
							mx10160	W91CRB-10-R-0051
	DAAB07-85-	DAAB07-90-		DAAB07-96-C-	DAAB07-01-	DAAB07-02-C-J010	N00164-09-	W91CRB-11-R-0001
	C-E032	C-F102	DAAB07-93-C-	J209	D-N414	DAAB07-02-C-J009	R-JQ02 -	SPM4A6-11-R-1478
	DAAB07-85-	DAAB07-90-	K006	DAAB07-02-C-	DAAB07-01-	DAAB07-02-C-J008	FGS	SPM4A611MCN18
	C-E033	C-F103	DAAB07-93-C-	J008	D-N411	W15P7T04AJ207	mx10160	
	mx9916	DAAB07-90-	K005	N00019-98-C-	DAAB07-98-	W15P7T04AJ208	H92222-08-	
	DAAB07-81-	C-F101		0047	C-J419		R-0040	
	C-1065				DAAB07-98-		mx10160	
					C-J418		H9222-10-R-	
					DAAB07-01-		0003	
					D-N410			

Tube Detail: (See links to more detailed tube data.)

Other tubes - US.

ITT -

US Tubes. Current: **5th Dec 2010**

Component	Tube	Details	NSN	Part Number	Milspec	Comments
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Date: **05/12/10 09:30**

18mm Inv

AN/AVS-6	MX10160	MX-10160 Image Intensifier	5855011514191		MIL-I-49428(CR)	
AN/AVS-6	MX10160	MX-10160 Image Intensifier	5855013805096			
AN/AVS-6	MX10160	MX-10160 Image Intensifier	5855014812659			Export... Pre 7710
AN/AVS-6	MX10160GS	MX-10160 GS Image Intensifier	5855014231497, 5855014577710	A3256389	PS/09/JXQR/078	Ground Support 2007. 7710 is the export version.
AN/AVS-6	MX10160HP	MX-10160 HP Image Intensifier			PS/07/805/0xx	Ground Support 2005- having trouble locating the NSN
AN/AVS-6	MX10160-HR	MX-10160 Image Intensifier	5855013867323	MX10160- HR		EXPORT ITEM...
AN/AVS-6	MX10160A/AVS- 6	MX-10160A Image Intensifier	5855014231497, 5855014577710	A3256389	MIL-PRF- 49428(CR)	Approx Omni IV/V
AN/AVS-6	MX10160A/UV		5855014712149			
AN/AVS-6	MX10160B/AVS- 6	Image Intensifier, 18mm, Gen IV	5855014736076	A3279453, A3279593	MIL-PRF- A3279593	Confirmed NGEOS Gen IV.
AN/AVS-6	MX10160B/AVS- 6	Image Intensifier, 18mm, Gen IV	5855013917077	MX10160B		Confirmed NGEOS Gen IV.
AN/PVS-15	MX10160B	18mm Gen III (IMAGE INTENSIFIER)USED IN THE AN/PVS-15	5855015489651	245180-907		IMAGE INTENSIFIER,N – Martin Military Inc... Gen4?
AN/AVS-6	MX10160C/AVS- 6	MX-10160C High Perf Image Intensifier	5855015034799	A3279602	MIL-PRF- A3279602B	Current Revision 17 Oct 2003
AN/AVS-6	MX-12389/AVS- 6	MX-12389 Image Intensifier		A3297322	MIL-PRF- A3297322	Omni VIII NEW AVS tube
AN/PVS-15	M851-1061	M851-1061 Image Intensifier, 18mm GenIII				L3/NGEOS approx OmniIV/V
AN/PVS-15	M883	M883 Image Intensifier, Gen III, 18mm				L3/NGEOS Pre-Omni I
AN/AVS-6	M890	M890 Image Intensifier, Gen III, 18mm				L3/NGEOS approx OmniIV/V
AN/AVS-6	F9800	ITT Series – 18mm Inverting			As per contract	Generic ITT Series
18mm Inv/Gain						
AN/PVS-14	MX11769	MX-11769 High Perf Image Intensifier	5855015044590	A3297310, A3297320	MIL-PRF- A3297320(CR)	
AN/PVS-14	MX11769/UV	MX-11769/UV High Perf Image Intensifier	5855014810819	A3264363		/UV
AN/PVS-14	MX11769/UV	MX-11769/UV High Perf Image Intensifier	5855015044590	A3297310		DAAB07-02-C-J010

AN/PVS-14	MX11769/UV	MX-11769 High Perf Image Intensifier	5855014443916	A3256350	MIL-PRF-A3256363	Autogated
AN/PVS-14	MX11769A/UV	MX-11769A/UV High Perf Image Intensifier	5855014711509	A3279450		/UV Autogated
AN/PVS-14	M814-1201	M814-1201 Image Intensifier, 18mm GenIII				L3/NGEOS approx OmniIII/III
AN/PVS-18	M898-1601	M898-1601 Image Intensifier, 18mm GenIII				L3/NGEOS Approx Omni III+
AN/PVS-14	F9815	ITT Series – 18mm Inverting w/gain			As per contract	Generic ITT Series
18mm non-inv						
AN/PVS-7	MX10130	IMAGE INTENSIFIER ASSEMBLY, 18 MM MICROCHANNEL WAFER MX10130()/UV			MIL-I-49453(CR)	6th November 1989
AN/PVS-7	MX10130a		5855012280941	A3140861		
AN/PVS-7	MX10130b		5855012280942	A3144308		
AN/PVS-7	MX10130c		5855013283540	A3144500		
AN/PVS-7	MX10130d	MX 10130 D High Perf Image Intensifier	5855014224720	A3256388	MIL-PRF-49453	Approx Omni IV/V
AN/PVS-7	MX10130d	MX 10130 D High Perf Image Intensifier	5855015044589	A3297300, A3297290	MIL-PRF-49453(NVI)	Approx Omni IV/V
AN/PVS-7	MX10130D/UV		5855014810818	A3264362		/UV
AN/PVS-7	MX10130E/UV	MX 10130 E High Perf Image Intensifier	5855014754454	A3279400		Filmless, Autogated
AN/PVS-7	M891	Image Intensifier, Night Vision M891-001	5855014818281			242241-002 - Roughly equiv 10130D
PVS-7/Export	XX1450	Image Intensifier GEN2 18mm Non Inverted	5855219035081	AED63901	Phototonis xx1450	
AN/PVS-7A	MX18281	Image Intensifier GEN2 18mm Non Inverted	5855012355491	207761-110	Gen2 Litton	believed to be US SHP
AN/PVS-7B	MX18282	Image Intensifier GEN2 18mm Non Inverted				believed to be US SHP
AN/PVS-7A	M873A	M873A, Image Intensifier, 18mm, Gen III				NGEOS Approx Omni II/III
AN/PVS7ABCDE	M891-1201	M891-1201 Image Intensifier, 18mm GenIII				NGEOS Approx Omni III
AN/PVS7ABCDE	F9810	ITT Series – 18mm Non Inverting.			As per contract	Generic ITT Series
25mm and Inv.						
AN/VVS-2	MX11619	MX-11619 Gen III 25mm Tube & Mag	5855013986170	A3245422		

AN/VVS-2		Gen II 25mm Tube & Mag	5855010271554			
AN/VVS-2	MX-9610	Tube & Magnifier, 25mm, Gen II				L3/NGEOS Gen II
PVS-4&TVS-5	MX9644	25 MM GEN II MX-9644/UV	5855001382386	SM-D-850310	MIL-I-49040	DAAB07-98-R-J490
PVS-4&TVS-5	MX9644/UV	IMAGE INTENSIFIER ASSEMBLY 25 MILLIMETER, MICROCHANNEL INVERTER MX-9644/UV			MIL-PRF-49040F	4 March 1999 Gen2 specification
PVS-4&TVS-5	MX11620	MX-11620 Gen III 25 mm	5855013986167	A3245418	MIL-PRF-49254	DAAB07-98-C-J418
PVS-4&TVS-5	MX11620	MX-11620 Gen III 25 mm	5960014495726	510-7330-306		Litton model 510-7330-306
18mm G2 INV						
AN/PVS-5	MX9916	NIGHT VISION GOGGLES AN/PVS-5A	5855010343845	SM-D-657310-2	MIL-I-49052G	From 1992
AN/PVS-5	M801-001	Image Intensifier , 18mm Gen II			NGEOS PVS-5 tube.	
AN/PVS-15	M865-001	M864-001 Image Intensifier, 18mm GenII				L3/NGEOS approx OmniII/III
18mm G2 non-inv						
AN/PVS-7	M872-002	M872-002 Image Intensifier, 18mm GenII				L3/NGEOS approx OmniII/III
AN/PVS-7(A/B/C)	M884	M884 Image Intensifier, 18mm, Gen II				Early L3/NGEOS Gen2
Other	GROUP1.					
KITE WS	MX9855A	EEV style ITT tubes... Inverting 44mm	5960990878717			ITT series for KITE
KITE WS	MX9855D	EEV style ITT tubes... Inverting 44mm	5960990878717			ITT series for KITE
KITE WS	M869	Image Intensifier, G3 M869 so suffix G3	5960990878717			KITE/MAXI-KITE
KITE WS	M869	Image Intensifier,G2 M868-001	5855014468197			KITE/MAXI-KITE
KITE WS	M869	Image Intensifier, G3 M869-901	5855014831350	208342-9601		KITE/MAXI-KITE
KITE WS / M937	M869	Image Intensifier, G3 M869-1601	5855014468197			G3
KITE WS / M937	M869	Image Intensifier, G3 M869-1602	5855014468197			G3

NOTE: Although F9800A does not exist (ITT never made Omni I tubes) the reference to it exists in military literature, leading to a belief that ITT later made a civilian version.

ITT Omni G Suffix denotes Autogating.

Tube	Contract	lp/mm uA/lm @830 @880 SNR Gain> Gain< FOM EBI MTF25 BLR Halo												Comments
ITT mx10160														
Omni Tubes														
F9800B	Omni II	45	1000	100	--	16.2	40000	70000	729	2.5	18	--	--	Enhanced
F9800C	Omni III	51	1350	135	--	19	40000	70000	969	2.5	20	--	--	Enhanced
F9800J	Omni III Plus	64	1350	135	65	18	40000	70000	1152	2.5	38	12	--	FOM 1250 Max
F9800 Omni III Plus	Omni III Plus	64	1350	--	--	--	--	--	--	--	--	--	--	Missing Data.
F9800K	Omni IV Full Milspec	64	1800	--	80	21	40000	70000	1344	2.5	38	12	1.25	Thick Film
F9800L	Omni V Full Milspec	64	1800	--	--	21	40000	70000	1344	2.5	38	12	1.25	Thick Film
F9800N	Omni V	64	1800	190	--	21	40000	70000	1344	2.5	38	--	--	Thick Film
F9800P	Omni IV	64	1800	190	80	21	40000	70000	1344	2.5	38	12	--	FOM 1600 Max
F9800RG	Omni VI	64	2000	--	--	26	40000	70000	1664	2.5	38	36	0.9	Pinnacle
F9800VG	Omni VII	64	2200	--	120	28	50000	80000	1792	2.5	38	45	0.7	Pinnacle
Non-Omni	Comments													
F9800SLN		--	--	--	--	--	--	--	--	--	--	--	--	reference only
F9800SLG		--	--	--	--	--	--	--	--	--	--	--	--	reference only
F9800A	Defacto Omni I	--	--	--	--	--	--	--	--	--	--	--	--	reference only
F9800AG	Autogated	64	1800	--	--	23	40000	70000	1472	2.5	38	36	0.9	Pinnacle
F9800WG	Weapons Grade	64	1800	--	80	22	50000	80000	1408	2.5	38	36	1.1~1.25	Pinnacle
F9800DTG2		64	1500	--	80	21	40000	70000	1344	2.5	38	36	1.25	Pinnacle
F9800TG		64	2000	--	100	26	40000	70000	1664	2.5	38	36	0.7	Pinnacle
F9800YG		64	1800	--	80	25	40000	70000	1600	2.5	38	36	1	Pinnacle
F9800TF		--	--	--	--	--	--	--	--	--	--	--	--	Civ Gen4
ITT mx10130 style														
F9810SLN		--	--	--	--	--	--	--	--	--	--	--	--	reference only
F9810SLG		--	--	--	--	--	--	--	--	--	--	--	--	reference only
F9810B		45	800	--	--	14.5	20000	35000	652.5	2.5	--	--	--	Enhanced
F9810C	Omni III	45	1200	--	--	16	27000	47000	720	2.5	18	--	--	Enhanced
F9810J	Gen3 Plus	51	1350	135	--	18	27000	47000	918	2.5	20	12	--	FOM 1250 Max
F9810N	Gen III Ultra	64	1550	150	--	19.2	40000	70000	1228.8	2.5	38	--	--	Thick Film
F9810P	Omni IV	64	1500	155	--	19.2	40000	70000	1228.8	2.5	38	12	--	FOM 1600 Max
F9810K		64	1800	--	80	21	40000	70000	1344	2.5	38	12	1.25	Thick Film
F9810DTG		64	1500	--	77	19.2	40000	70000	1228.8	2.5	38	12	1.25	Pinnacle
F9810WG	Weapons Grade	64	1800	--	80	22	50000	80000	1408	2.5	38	36	1.1-1.25	Pinnacle
F9810UG		64	1800	--	80	25	40000	70000	1600	2.5	38	36	1.1	Pinnacle

F9810VG		64	2000	--	100	25	50000	80000	1600	2.5	38	36	1	Pinnacle
F9810YG		64	1800	--	80	25	40000	70000	1600	2.5	38	36	1	Pinnacle
mx11769 type.														
F9815A		--	--	--	--	--	--	--	--	--	--	--	--	Seen in reference
F9815B	Omni II	45	800	--	--	14.5	40000	70000	652.5	2.5	18	--	1.25	Enhanced
F9815C	Omni III	51	1200	--	--	18	40000	70000	918	2.5	20	--	1.47	Enhanced
F9815G		--	--	--	--	--	--	--	--	--	--	--	--	Confirmed/Unknown
F9815SLN		57	1350	--	--	16.2	--	--	923.4	2.5	--	--	--	Select
F9815SLG		57	1350	--	--	16.2	--	--	923.4	2.5	--	--	--	Select Autogated
F9815J	Omni III+	57	1350	--	135	18	40000	70000	1026	2.5	27	12	--	FOM 1250 Max
F9815L		64	1500	--	77	19.2	40000	70000	1228.8	2.5	38	12	1.25	Thick Film
F9815N	Omni V/Ultra	64	1500	150	--	19.2	40000	70000	1228.8	2.5	38	--	1.25	Thick Film
F9815P	Omni IV	64	1500	--	155	19.2	40000	70000	1228.8	2.5	38	12	--	FOM 1600 Max
F9815EG		--	--	--	--	--	--	--	--	--	--	--	--	Pinnacle
F9815AG		64	1800	--	80	22	40000	70000	1408	2.5	38	36	1.1	Pinnacle
F9815RG		64	2000	230	--	25	40000	70000	1600	2.5	38	--	0.9	Pinnacle
F9815WG	Weapons Grade	64	2000	--	100	25	40000	70000	1600	2.5	38	36	1.1-1.25	Pinnacle
F9815UG		64	1800	--	80	25	40000	70000	1600	2.5	38	36	1.1	Pinnacle
F9815VG		64	2000	--	100	25	40000	70000	1600	2.5	38	36	0.9	Pinnacle
F9815DTG2		64	1500	--	77	21	40000	70000	1344	2.5	38	36	1.25	Pinnacle
F9815YG		64	1800	--	80	25	40000	80000	1600	2.5	38	36	1	Pinnacle
Other														
F9801 Omni III plus		51	1500	--	--	--	--	--	--	--	--	--	--	To Add To.
F9855A		--	--	--	--	--	--	--	--	--	--	--	--	44mm Inverting
F9855D		--	--	--	--	--	--	--	--	--	--	--	--	44mm Inverting

Litton/NGEOS/L3

Litton specs based on NGEOS datasheets.

Tube	Contract	Ip/mm	uA/lm	@830	@880	SNR	Gain>	Gain<	FOM	EBI	MTF25	BLR	Halo	Comments
M801-001	Omni I	28	240	15	--	4.5	18000	25000	126	2.5	20 @15	--	1.37	Gen2 mx9916
M814-1201		45	1200	120	72	17.1	20000	30000	769.5	2.5	16	5	1.47	Gen3 PVS-14
M851-1061		64	1800	190	80	21	40000	70000	1344	2.5	38	12	1.25	Gen3 T-ANVIS
M864-001		57	400	32	--	12	20000	30000	684	2.5	35	--	1.5	Gen2 T-ANVIS
M868-001	--	57	400	32	--	12	20000	30000	684	2.5	35	--	1.37	Gen2 KITE
M869-901		64	1800	190	80	21	40000	70000	1344	2.5	38	--	1.25	Gen3 KITE

M872-002	57	400	32	--	12	20000	30000	684	2.5	35	--	1.37	Gen2 PVS-7A
M873A	45	1200	--	72	17.1	20000	35000	769.5	2.5	16	5	1.47	Gen3 PVS-7A
M883	40	800	60	--	16.2	20000	35000	648	2.5	8	--	1.37	Gen3 PVS-12A
M884	32	240	15	--	n/a	18000	25000	n/a	2.5	20 @15	--	1.37	Gen2 PVS-7B
M890	64	1800	--	80	21	40000	70000	1344	2.5	38	12	1.25	Gen3 T-ANVIS
M891-1201	51	1600	--	75	19.5	20000	35000	994.5	2.5	16	5	1.47	Gen3, PVS-7()
M898-1601	64	1500	--	--	19.2	40000	70000	1228.8	2.5	38	--	1.25	Gen3 PVS-18
mx9610	20-40	175-800	5-9	@850	2.0-7.0	7000	60000	n/a	0.1-4.0	5-20	n/a		Gen2 Inverter VVS
mx9964	20-40	240	10	@850	--	40000	70000	n/a	2	20 @15	n/a		Gen2 PVS-4
mx10130D	64	1800	190	80	21	40000	70000	1344	2.5	38	12	1.25	Gen3 PVS-7B
mx10160A	64	1800	190	80	21	40000	70000	1344	2.5	38	12	1.25	Gen3 T-ANVIS
mx10160B	72	2100	200	100	36	30000	80000	2592	0.5	38	36	0.4-1.25	Gen4 T-ANVIS
mx11619	45	1200	130	65	17.5	40000	110000	787.5	2	13	12	1.3	Gen3 VVS
mx11620	45	1550	140	70	25	20000	90000	1125	1	20	14	0.7-1.6	Gen3 PVS-4
mx11769	64	2100	200	100	21	40000	70000	1344	0.5-3.5	38	36	1.0-2.0	Gen3 PVS-14

Photonis, KATOD and others

Photonis

Tube	Ip/mm	uA/lm	@800	@850	SNR	Gain>	Gain<	FOM	EBI	MTF30	MTF25	MTF15	MTF7.5	MTF2.5	BLR	Halo	Inv	Dia	NVG	Comments
XX2050F	58	700	60	50	24	30000	40000	1392	0.15	30	38	58	80	92	--	--	N		PVS-7	XD4 18mm Fat Anvis
XX2050AH	58	700	60	50	20	22000	--	1160	0.15	30	38	58	80	92	--	--	N		PVS-7	XD4 18mm Fat Anvis
XX1450TJ	48	--	--	--	--	15000	--	--	0.2	--	--	--	--	--	--	--	N			18mm Gated Industrial IIT
XX1450XK	45	380	33	25	--	10000	--	--	0.25	--	--	--	--	--	--	--	N			18mm Industrial IIT.
XX1450KT	45	60	n/a	n.a	--	10000	12560	--	0.01	--	--	--	--	--	--	--	N			18mm Gated Industrial U/V IIT
XX1451	32	240	15	10	12	12560	25120	384	0.25	--	--	--	--	--	--	--	N		AVS-6	Believed to be surplus tubes
XX1440ES	40	60	n/a	n/a	--	15700	25120	--	0.15	--	--	--	--	--	--	--	Y			18mm Industrial U/V IIT

XX1441	30	270	20	15	12	25120	37680	360	0.4	--	--	--	--	--	--	--	Y	18mm – Reputed to be “failed” ANVIS tubes.
PP0340AT	30	55	n/a	n/a	35	10000	12600	--	0.1	--	--	--	--	--	--	--	N	25mm Gated Industrial U/V IIT.
PP0400G	34	45	n/a	n/a	30	12600	--	--	0.02	--	--	--	--	--	--	--	N	40mm Gated Industrial U/V IIT
XX1700DN	60	700	55	45	22	19000	22000	1320	0.15	--	n/a	--	--	--	--	--	N	Sony ICX423 Low Light 2/3” IICCD
XX1950DK	48	600	50	40	21	28200	37700	1008	0.15	--	35	54	76	90	--	--	N	PVS-7 SHD-3 mx10140 Fat Anvis
XX1940AM	48	600	55	45	20	18500	28000	960	0.15	22	30	50	70	88	--	--	Y	AVS-6 SHD-3 mx10160 Slim Anvis
XX2050R	58	700	60	50	24	30000	40000	1392	0.15	--	--	58	80	92	--	--	N	PVS-7 XD4 mx10130 Fat Anvis
XX2040C	58	700	60	50	24	25000	32000	1392	0.15	30	38	58	80	92	--	--	Y	AVS-6 XD4 mx10160 Slim Anvis
XX2040AN	64	700	60	50	22	31000	37500	1408	0.15	30	38	58	80	92	--	--	Y	KITE XD4 Fat Anvis Inverted MX868 compat
XX2050BL	64	700	60	50	24	30000	40000	1536	0.15	30	38	58	80	92	--	--	N	PVS-7 XD4 10130 Fat Anvis
XX2040AR	64	700	60	50	24	32000	45000	1536	0.15	35	45	65	80	92	--	--	Y	AVS-6 XD4 mx10160 Slim Anvis
XX2040AU	64	700	60	50	24	28000	38000	1536	0.15	35	45	65	80	92	--	--	Y	AVS-6 XD4 mx10160 Slim Anvis
XX2040CX	64	700	60	50	24	28000	38000	1536	0.15	35	45	65	80	92	--	--	Y	AVS-6 XD4 mx10160 Aviation “Golden Bullet”
XX2550F	70	800	78	65	28	30000	50000	1960	0.15	35	46	67	82	93	--	--	N	PVS-7 XR5 mx10140 Fat Anvis
XX2540D	70	800	78	65	28	30000	50000	1960	0.15	35	46	67	82	93	--	--	Y	AVS-6 XR5 mx10160, Slim Anvis
XX2540B	70	800	78	65	28	30000	50000	1960	0.15	35	46	67	82	93	--	--	Y	AVS-6 XR5 mx10160 Aviation “Golden Bullet”
Harder Digital HD1430	57-68	400	--	--	--	100	--	--	--	--	--	--	--	--	--	--	Y	First Generation

HD1400	40	400	--	--	4.5	50000	70000	180	--	--	--	--	--	--	--	--	Y	PVS-4	Gen2 Inverter Tube
HD1405	32	450	--	--	--	15000	30000	--	--	--	--	--	--	--	--	--	Y	VVS2	Gen2 FO Magnifyer
HD1450	32	350	20	15	3.2	50000	70000	102.4	0.2	--	--	25	60	90	--	--	Y	PVS-4	Gen2 Inverter Tube
HD1455	32	350	20	15	3.2	20000	--	102.4	0.2	--	--	25	60	90	--	--	Y	VVS2	Gen2 FO Magnifyer
HD1520	64	1850	--	--	25	40000	70000	1600	--	--	--	--	--	--	--	--	Y	AVS-6	Gen3 Slim ANVIS
HD1521	64	1850	--	--	25	40000	70000	1600	--	--	--	--	--	--	--	--	N	PVS-7	Gen3 FAT
HD2100	64	700	--	--	23	35000	55000	1472	--	--	--	--	--	--	--	--	Y	AVS-6	SuperSecondGen Slim ANVIS
HD2100U	64	675	50	21	21	35000	50000	1344	0.25	--	25	55	70	92	--	--	Y	AVS-6	SuperSecondGen Slim ANVIS Commspec
HD2102	64	700	--	--	23	35000	55000	1472	--	--	--	--	--	--	--	--	N	PVS-7	Gen2 FAT
HD2102U	64	675	50	21	21	35000	50000	1344	0.25	--	25	55	70	92	--	--	N	PVS-7	Gen2 FAT Commspec
Katod Inc																		Dia NVD	
EPM-108G-00-22A	40	500	--	40	5.5	--	--	220	0.15	--	--						?		S25 Gen2
EPM-108G-10-22A	57	550	--	45	22	50000	--	1254	0.25	--		50	72	88	--	--	N		S25 Gen2 plus
EPM-108G-10-22B	51	550	--	35	20	40000	--	1020	0.25	--		42	67	87	--	--	N		S25 Gen2 plus
EPM-108G-10-22S	64	600	--	50	24	55000	--	1536	0.25	--		55	78	90	--	--	N		S25 Gen2 plus
EPM105G-03-22A	57	550	--	45	22	50000	--	1254	0.25	--		50	72	88	--	--	N	43	S25 Gen2 plus 18mm GIFO Concave-R40
EPM105G-03-22B	51	550	--	35	20	40000	--	1020	0.25	--		42	67	87	--	--	N	43	S25 Gen2 plus 18mm GIFO Concave-R40

EPM105G-03-22S	64	600	--	50	24	55000	--	1536	0.25	--		55	78	90	--	--	N	43	S25 Gen2 plus 18mm GIFO Concave-R40
EPM105G-04-22A	57	550	--	45	22	50000	--	1254	0.25	--		50	72	88	--	--	N	43	S25 Gen2 plus 18mm GIFO Flat
EPM105G-04-22B	51	550	--	35	20	40000	--	1020	0.25	--		42	67	87	--	--	N	43	S25 Gen2 plus 18mm GIFO Flat
EPM105G-04-22S	64	600	--	50	24	55000	--	1536	0.25	--		55	78	90	--	--	N	43	S25 Gen2 plus 18mm GIFO Flat
EPM105G-03-32A	57	550	--	45	22	50000	--	1254	0.25	--		50	72	88	--	--	N	43	PVC-7B S25 Gen2 plus 18mm GIFO Concave-R38
EPM105G-03-32B	51	550	--	35	20	40000	--	1020	0.25	--		42	67	87	--	--	N	43	PVC-7B S25 Gen2 plus 18mm GIFO Concave-R38
EPM105G-03-32S	64	600	--	50	24	55000	--	1536	0.25	--		55	78	90	--	--	N	43	PVC-7B S25 Gen2 plus 18mm GIFO Concave-R38
EPM105G-03/1-32A	57	550	--	45	22	50000	--	1254	0.25	--		50	72	88	--	--	N	43	PVS-7C S25 Gen2 plus 18mm GIFO Concave-R18
EPM105G-03/1-32B	51	550	--	35	20	40000	--	1020	0.25	--		42	67	87	--	--	N	43	PVS-7C S25 Gen2 plus 18mm GIFO Concave-R18
EPM105G-03/1-32S	64	600	--	50	24	55000	--	1536	0.25	--		55	78	90	--	--	N	43	PVS-7C S25 Gen2 plus 18mm GIFO Concave-R18
EPM105G-03/2-32A	57	550	--	45	22	50000	--	1254	0.25	--		50	72	88	--	--	N	43	PVS-7A S25 Gen2 plus 18mm GIFO Concave-R14
EPM105G-03/2-32A	51	550	--	35	20	40000	--	1020	0.25	--		42	67	87	--	--	N	43	PVS-7A S25 Gen2 plus 18mm GIFO Concave-R14
EPM105G-03/2-32A	64	600	--	50	24	55000	--	1536	0.25	--		55	78	90	--	--	N	43	PVS-7A S25 Gen2 plus 18mm GIFO Concave-R14
EPM105G-03/3-32A	57	550	--	45	22	50000	--	1254	0.25	--		50	72	88	--	--	N	43	PVS-7C S25 Gen2 plus 18mm GIFO Concave-R18 Short

EPM105G-03/3-32B	51	550	--	35	20	40000	--	1020	0.25	--	42	67	87	--	--	N	43	PVS-7C	S25 Gen2 plus 18mm GIFO Concave-R18 Short
EPM105G-03/3-32S	64	600	--	50	24	55000	--	1536	0.25	--	55	78	90	--	--	N	43	PVS-7C	S25 Gen2 plus 18mm GIFO Concave-R18 Short

New Omni IX standard - Comparison to Omni VIII.

Notes....	Omni VIII	Omni IX	Notes
Screen	P43	P43 or P45	Not surprising white is listed now.
Integral PSU	1.5 to 3.0v	2.0 to 3.0v	Does not prohibit lower, but does not require it either.
Gross Distortion	15 micron per mm	15 micron per mm	Same
Chicken Wire	Zone 123, 0,0/3,0/6/12	Zone 123 0,0/2,0/2/6	All new specifications are now in Millimeters... Quite telling.
			Also much less chicken wire is acceptable now. About twice as good
Ion Barrer	10 type B holes	5 type B holes	More pressure for quality in filmed tubes.
Test light	2700 to 2900K	2856k+/- 50K	Tighter specs to avoid inflating milspecs.
PC Sensitivity	2000 uA/lm	2200/1700 uA/lm	Higher spec, plus a filmless minimum.
830nm		190 240/185	mA/W Minimum - Second number filmless
880nm		80 120/90	mA/W Minimum - Second number filmless
EBI	"3.0"	"2.0"	Tightest EBI ever... EVER... Clearly affecting military applications.
Lum Gain Max/Min Low Light	Min 40K, Max 80K	Min 80K, Max 160K	Doubled.
Lum Gain Max/Mil High light	Min 10K, Max 21K	Min 12.5K, Max 25K	Increased
Lum Gain 1 FC	4.2 Max	5.0 Max	Can be a little brighter in these situations
Lum Gain 20 FC	4.2 Max	5.0 Max	Can be a little brighter in these situations
Halo	1mm Max	0.75mm	Halo is a LOT smaller - Much stronger parts required.
S/N	25 minimum	33 minimum	This is a HUGE increase and a BIG tactical advantage over other countries
Fixed Pattern Noise	"+/- 10%"	"+/- 5%" plus 6 point meas	Twice as tight, and constraints around how it's measured (tree bark issue?)
Multi boundary Noise	"+/- 10%"	"+/- 8%"	Tighter specs here.
Output brightness		3:01	3:01 Slightly tighter specs here with respect to measurement set up.
Image Alignment	0.006 (0.152mm)	0.152mm	They really could have done better here. Photonis is killing them.
Resolution Center/Edge	64lp/mm - 57 lp/mm	72 lp/mm - 64 lp/mm	BIG increase here... Not that it wasn't expected, but this is a spec.
High light	36 lp/mm	36 lp/mm	Still crappy... Photonis is still killing them here too... Has the US military never heard of lights?
MTF 2.5,7.5,15.0,25.0	nom,nom,61,38	83, 75, 58, 40	Clearly something bad happened here, so the spec is actually a little tighter....
Useful Cathode Diameter		17.5	17.5 Same.
Dark spots Large zone 1,2,3	0,0,0	0,0,0	Same
Dark spots Medium zone 1,2,3	0,1,1	0,0,1	BIG change... No more Zone2 spots.
Dark spots Small zone 1,2,3	0,2,2	0,0,2	BIG change... No more Zone2 spots.
Veilling Glare	forget it.	forget it.	Honestly, this is going to take me a little while to calculate. It's so different now.
Shock	75 Gs	75 Gs	Again, falls short of Photonis... Could have done better here.
Temp Extremes	"-37 to +52"	"-40 to +52"	Must work down to -54 though, as the new spec. THIS is why the US denies global warming.
Reliability.			
Life Hours		7500	12500 Much longer
Accelerated Hours		1500	2500 Much longer
AH Min Lum Gain	35000 to 95000	60,000 to 190,000	MUCH higher - FULL performance at EOL...
AH Min EBI	"3.0"	"2.0"	Not to change during life
AH Min Center Res		64	64 Strange they let this one slip.
AH Min High Light		36	36 Strange they let this one slip.
AH Min UCD		17.5	17.5 Same
AH Min Bright	As per spec	As per spec	Not to change during life
AH Min Screen	As per spec	As per spec	Not to change during life
Steady State Operation Min		50% 90% within 1 second	A lot of changes here, requiring it to perform within a minimum time after storage.
MTF Measure	0.2 lp/mm	0.25 lp/mm	Slightly higher requirement here for MTF measurements too.

Terminology change	Compliant Product	Qualified Product	No longer Milspec Compliant - Now it's Milspec Qualified. Interesting implications...
Operational Checks	None.	3.0v applied and see glow.	This means any tube that meets this requirement is now Milspec... Interesting this is now a spec....
Point of linear operation			3.50E-04 Lx. Used to be in FC. Also MUST be more linear. Half improved... Interesting.
Other notes		Defined vibration profile	

End of page.